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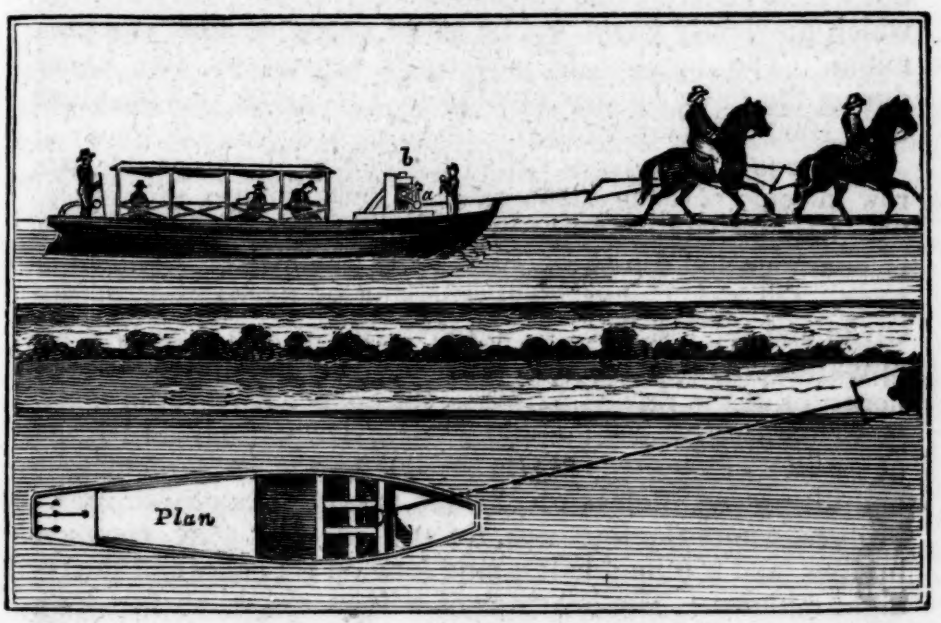
FLY BOATS.



As the subject of 'Fly Boats' will doubtless soon become of considerable interest to the people of this country, we have thought proper to devote some attention to it. Besides the following, for which we are indebted to the Daily Advertiser, we have on hand other important information, which will probably appear in the next number.

So much attention has in this country been devoted to, and money expended in, the facilities of rapid travelling, that it is a little surprising that 'Fly Boats,' which have been so successfully adopted in Great Britain, have not been introduced

upon our canals for the transportation of passengers. It must be owing to a want of knowledge of the successful results of experiments made in England, that they are not generally in use in the United States. 'Fly Boats,' as they are aptly called, are made of sheet iron, from 70 to 90 feet in length, and from 6 to 7 feet in width, and capable of carrying seventy to eighty passengers; they are drawn by two horses at any rate of speed of which the animals are capable, but usually at the rate of 10 or 12 miles the hour. The form is that of a racing gig, sharp fore and aft, and best calculated to cut the water, encountering the least resistance.

The first experiments were made, and the Iron Fly Boats were first introduced, in the year 1830, on the Ardrossan Canal in Scotland, a short narrow canal connecting Glasgow with the town of Johnston. This canal is only 12 miles long, and is particularly ill adapted to experiments of this description; but which, nevertheless, have so well succeeded, that the stock which previously could not be *given away*, is now at a premium. The number of passengers arrived on this canal during the three summer months of 1833, was 79,832, more than 1000 per working day.

This canal, sometimes called the Paisley Canal, is so narrow in some parts as not to allow of boats passing each other. The time usually occupied in performing the whole distance, is one hour and fifteen minutes, or at the rate of 9 miles the hour. On the Union Canal, connecting the waters of the Clyde and the Forth, on which these boats are in successful operation, the distance, 32 miles, has been performed in three hours, or at the rate of 11 miles per hour. A writer in Glasgow, speaking of 'Fly Boats,' says—'I have performed a voyage of 56 miles along two canals, including the descent of four and the ascent of eleven locks, the passage of eighteen drawbridges, where the line was thrown off, and sixty common bridges, and a tunnel half a mile long, in six hours and thirty-eight minutes. The boat was of a *trim shape*, 69 feet long and 9 feet broad, and was drawn in stages by two horses each stage, and carried thirty-three passengers, with their luggage and attendants.' On the Royal Canal in Ireland, connecting Dublin with Mullingar, County of Westmeath, the distance, 56 miles, is performed in six hours, including stops, or at the rate of 9 miles the hour. On a portion of this canal the writer was conveyed at the rate of 11 miles per hour, exclusive of the time required to pass five locks, which occupied exactly eleven minutes. 'Fly Boats' have been introduced on several

canals in England with success, and the consequence has invariably been a great increase of business and travel.

The great objection hitherto made to rapid travelling on canals, is the injury done to the banks by the wave raised by the boat; and this has been sufficient and fatal. But this subject appears not to have been sufficiently understood, and it is yet to be accounted for why a boat, going at the rate of ten or twelve miles an hour, produces no wave, or one so slight as hardly to be perceptible, while the same boat, going at the rate of 6 miles the hour, creates a wave highly detrimental to the sides of the canal: yet such is nevertheless the fact. At very low velocities the rise of water is no greater than the quantity of water displaced by the floating body, and the same is true of great velocities. It has been ascertained by experiments, that a boat starting at a low velocity, and that velocity increased *gradually* to 6 miles the hour, creates such a wave as to wash over the sides of the canal; and this wave is so difficult to be overcome and passed, that it is better to stop and start again than attempt it; while a boat starting at the rate of ten miles the hour, produces little or no wave; and it is easier for two horses to draw a boat with seventy or eighty passengers, at the rate of 15 miles the hour, than at the low rate of 6. The writer before referred to remarks, 'when started at a low velocity, these boats move apparently along the smooth surface of the canal, meeting with no resistance other than that of a very small part of the fluid which they intersect. If in addition to this resistance, they are burdened with the obstruction of a small body of water carried on before, it is not perceptible. Let the speed be increased, and a body of water rises in front of the boat, preceding it at various distances, dependent on the velocity of the boat, and increasing by degrees till it rises to eighteen inches, and two feet, and occasioning such a resistance that the horses dragging the boat would, if it were allowed to continue, be unable to proceed for any distance. If, however, the speed be further increased, the boat advances to, and passes the wave, which subsides behind, and the water in the canal becomes again perfectly still.' If a wave is created, and it is hardly possible to suppose that *some* should not be, it is behind the boat and not before it, and it is so slight that in the narrow Paisley Canal, before referred to, no injury to the banks is perceptible, though these boats have been more than three years in operation; nor could I learn on particular inquiries of the lock tenders and others on the Royal Canal,

that any injury had accrued to that canal. I shall therefore consider the difficulties entirely overcome, and the facts established by sufficient experience, and leave it to others to assign the reasons.

The following is a more detailed account of the construction of an iron Fly Boat. They are from 70 to 90 feet long, or any length the locks will admit, and from 6 to 7 feet wide. The hulls are made of sheet iron plates of about No. 16, wire gauge, firmly riveted to iron ribs. The bottoms are flat or nearly so, with one or two keys. Their inside is lined with half inch boards, and there are seats on each side, furnished with cushions, with a passage between. The boats are covered with painted awnings stretched over wooden hoops, and lined with glazed cotton, and are usually divided into two cabins, handsomely fitted up, with all the conveniences of windows, doors, &c. These boats are built as light as possible, and draw, when loaded, from six to twelve inches of water.

The cheapness of this mode of conveyance is not one of its least recommendations. The cost of a boat in England is £125, or about $550, and the whole expense of running four trips, or 48 miles, on the Paisley Canal, including horses, attendants, interest, and 20 per cent. for a reserved fund to replace boats, horses, and for other incidental expenses, is £700, or about $3,100 per annum, or $10 per day, or 22 cents per mile. In this country, the first cost of the boat would be somewhat greater, while the cost and keeping of horses would be less than in England.

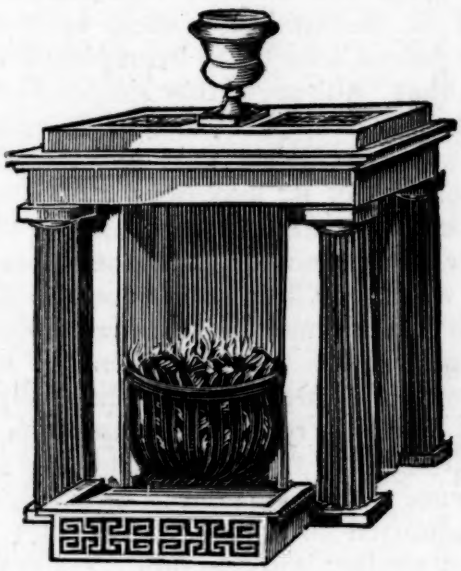
The fare in the Paisley Canal, is one penny in the first and three farthings per mile in the second cabin.

No one can doubt the necessity and propriety of the immediate introduction of the iron Fly Boats on the canals in this country, particularly on those which, like the Erie Canal, have long levels. The distance between Utica and Schenectady, 80 miles, (supposing these boats to travel at the same rate as those on the English canals,) would be accomplished in ten hours, including stops, which now occupies twenty-two hours, and would be done in the day, and dispense with the inconveniences of a night passage. The distance between Utica and Syracuse, 60 miles on the long level, having no locks to pass, could be accomplished with ease in five hours, and the whole distance between Syracuse and Schenectady might in summer be performed between sun and sun, which now occupies a day and a night; and the

same advantages would accrue on the canals in other portions of the country.

As a mode of conveyance, the 'Fly Boat' is one of the most agreeable;—combining ease and rapidity of motion, it is free from the fatigue of a stage coach, and the jar of the railroad car.

PIERPONT'S DORIC FIREPLACE.



We present the Report of the Committee on Science and the Arts of the Franklin Institute, on the Stove or Grate, denominated the Doric Fireplace, patented by Rev. John Pierpont, of this city, with the belief that the author of the invention here described, is one of the few who are successful in their endeavors to benefit the community by the exercise of inventive power. We have delayed its publication for the sake of procuring a correct representation of the Fireplace, which we could not before do, but which justice seemed to demand.

The stove or grate under consideration claims to furnish, according to the words of the patentee in the specification, 'a new and useful method of warming and ventilating rooms, by burning anthracite or other coal, in an open and portable fireplace, or stove, which I call the Doric Fireplace; which may be made in a variety of different forms, but in every form must be constructed and arranged upon the principle of supplying to the room that is to be warmed and

ventilated, in lieu of the air that, through the smoke flue, or chimney, passes out of it, and that by the operation of the fire itself—an equal quantity of fresh air from without the room, which, as it comes in, is warmed by being made to pass over or between the heated surfaces of bodies not metallic; or if metallic, bodies that have not been brought into contact with a burning substance.'

The apparatus is denominated the Doric Fireplace, because the inventor has preferred to construct it with Doric columns, and to give to its other parts a form corresponding with that order of architecture, as represented in the above engraving. It is observed, however, in the specification attached to the patent, which has been placed in the hands of the committee, that 'although this simple form is preferred, from a belief that its beauty consists in its severe simplicity, it may yet be varied in this respect; and that the columns, or indeed any other part of it, may be ornamented with brass, polished steel or other material, according to the taste of the manufacturer or the purchaser, without departing from the principle upon which the fireplace is constructed.'

Fireplaces and stoves have been frequently constructed, in which air from without the apartment to be warmed, is admitted to circulate between plates heated by the fire, and thence to pass into the room, to supply the place of that which passes through the fire, and up the flue; but the committee is not aware that this has been effected, without allowing the air so admitted to come into contact with metallic plates, heated by contact with the fire. The accomplishing of this object is the characteristic feature of the Doric Fireplace.

The stove, with the exception of the lining, is in preference, constructed entirely of cast iron; but the fuel, which is contained in an open grate, is not in contact with the metal, excepting with that portion of it which constitutes the grate bars. The back and ends of the chamber of combustion are formed of fire brick, moulded for the purpose. This fire brick is kept, by suitable ledges, from contact with the metallic plates which form the shell of the stove, so that the air admitted from without may pass up freely between the two, and enter the room through fret-work openings in the top plate, or other convenient apertures. In the specification, very particular directions are given respecting the form, and the mode of uniting the different parts; but of these it is unnecessary to give a detail in this report, as they may be

varied in numerous ways, without affecting the principle upon which the main dependence is placed. A point of the highest importance in putting this stove together, is, to render the junctures perfectly air tight, that there may be no admixture of the gaseous products of combustion, with the heated air by which the room is to be ventilated; the danger of this has, it appears by the testimony of those who have used it, been effectually guarded against, by the skilful manner in which the junctures are made; so that, with ordinary care, a good mason will not fail in the setting it in a proper manner.

Your committee was apprehensive that, from the imperfect conducting power of fire brick, but a small portion of heat would be communicated to the cold air admitted from without; but they are assured by one of its members, who has had a fireplace of this description in use for a considerable period, that soon after lighting the fire, the air flows in through the proper apertures, as highly heated as is either desirable or safe; while it does not, even when the fire is most intense, undergo that deterioration which is always produced by highly heated metallic surfaces.

From an examination of the stove itself, with the addition of the testimony before them, your committee are of opinion that it is well calculated to fulfil the intentions of its inventor —namely, the introduction of a sufficient quantity of air to ventilate the room, which air is first rendered warm by a portion of that heat which, in grates of the ordinary construction, is entirely wasted.

By order of the committee.

November, 13th, 1834. WILLIAM HAMILTON, Actuary.

DESCRIPTION OF COAL.

[Furnished for the Mechanic.]

One of the most abundant materials in the universe is *carbon*, of which charcoal and other coal are composed. It is not, however, *pure*, in any of these forms, but combined with other earthy matters in the mineral coal, and in charcoal with hydrogen gas and some other incidental alloys. Carbon is the basis, or that which forms the solidity or stamina, of all vegetable substances. It will be readily seen that wood, converted into charcoal, has lost by no means a great portion of

its substance. The process of burning wood consists, first, of driving off the watery portion of its substance; then the *hydrogen*, which is also a material in all vegetables, is set free and burns as it ascends in the air—this is what makes the flame. Nothing, except it contains hydrogen gas, burns with flame. Lastly, the carbon itself is consumed. The wood, after its water and hydrogen are burned out, assumes the form of coals, which, in burning, are red, but if the fire be put out before they are consumed, they are seen to be black coal. When all the carbon is consumed, ashes still remain. These consist of the earthy parts, and the *salts* which are contained in vegetables, which are incombustible. An important portion of wood-ashes is *potash*, which, it is well known, is an ingredient of common soap. The ashes of sea plants contain soda, which is another alkali, similar to potash. Potash is obtained from ashes simply by solution in water, which dissolves the potash from the ashes, and then, by boiling, the potash is obtained solid. Purified potash is called pearlash.

When wood is coaled in pits, the access of a draught of air is excluded, by covering the whole pile with earth. A fire just sufficient to drive out the watery portion of the wood, is kept up, but not to permit the hydrogen to flame, or the charcoal itself to consume. The manufacture of gas from coal consists in driving off, by a kind of distillation, but without burning, the hydrogen, which, after being purified by passing through lime-water, is conveyed in pipes wherever it is wanted. The coal remaining is called coke. It is much used in England in steam-engines, being preferred as fuel for that purpose, because it does not give out smoke.

Mineral coal is of several kinds. The principal distinctions are hard and soft coal. The hard coal is called *anthracite*, from the Greek word *anthrax*, which means coal, perhaps because it is purer carbon than the soft coal. As it is mostly destitute of hydrogen, it burns without flame. On account of its compactness and difficulty of decomposition by heat, it requires an extreme heat to ignite it, although it makes, as we say, a very hot fire. The soft coal burns easily, and contains much hydrogen, as well as other gases. It appears to contain less earthy materials than the hard coal. Coal is obtained from veins in the earth, and many deep mines are worked in England; in our country, however, much of it lies on the very surface of the ground.

The fatal explosions of what is called the fire-damp, in the English coal mines, is a subject which has called forth the

serious attention of the philanthropist and the philosopher. It remained, however, for the great chemist, Sir Humphrey Davy, to achieve for the miner a conquest over this fearful element of death. It is a gas, (carbureted hydrogen,) compounded of hydrogen and carbon, which is inflammable, and which explodes, when burned. In fact, pure hydrogen will, under certain circumstances, explode, when burned in admixture with common air, or oxygen gas.

Peat is a combustible substance, formed of vegetable remains; it is dug from the earth at small depths, most frequently in swamps and bogs. The vegetable remains—roots and fallen leaves—buried in the earth, become partially decayed, but owing to the privation of the atmosphere, they are not entirely decomposed, as would be the case above ground, the carbon, which, as has been shown, is the more substantial part of the vegetable, remaining; and this, mixed with earthy particles and portions of vegetables still less decayed, seem to be the components of peat, which in some places, is extensively or altogether used for fuel.

Tallow and oil, which are so extensively used for lighting our apartments as to be ranked among the necessaries of life, also contain carbon. It is this which makes lamp-black, which, as may easily be perceived, has a strong resemblance to charcoal. It is used as a painter's color, and also probably in the composition of blacking and various other black varnishes. Such are some of the various ways in which coal, or chemically speaking, carbon, becomes useful to us, merely for burning. There is probably no material so proper for this purpose; none which will give such an equable and at the same time, sufficiently intense heat and light, being at the same time so abundantly distributed throughout the kingdom of nature, as to bring it within the reach even of the poorest of earth's inhabitants.

Steel is a combination of iron with a small proportion of carbon. To this it owes its extreme hardness, and its property of being tempered. Cast iron contains a still smaller portion. Pure iron is soft, and ductile, and almost incapable of being melted.

Black lead, or plumbago, is also a compound of iron and carbon, of which the latter is in the greatest proportion. It is therefore improperly named black lead, as there is no lead in its composition.

In chemical combination with lime, (carbonate of lime,) carbon forms those minerals called calcareous. These are principally, marbles, limestones and chalk. Without the aid

of carbon, such beautiful stones as the various marbles, so hard, and capable of receiving so fine a polish, would never have existed. The uses of marble in architecture and the fine arts are various, and its place could with difficulty be supplied by any other material. By exposing stones of this kind to an intense heat, the carbon is burnt out, and the lime remains pure. This operation is called burning lime. Marine shells, such as oyster shells, are composed of carbonate of lime, and these make lime, as well as the mineral limestone.

The hardness and durability of wood depends on the quantity of carbon which it contains. The hard woods, which receive a fine polish, contain a greater portion of carbon than soft and light wood. Thus the same property for which we prize wood as fuel, gives it its value as a material in the useful arts. In proof of this fact, we need only observe that hard heavy wood makes the best and most solid charcoal.

NECESSITY OF KNOWLEDGE TO INSURE THE HEALTH OF MECHANICS.

[Furnished for the Boston Mechanic.]

'THERE is no class of society,' says the Journal of Health, 'to whom the laws of Hygiene (health) is of greater importance than it is to that composed of the laborer and mechanic. To such, a healthful and vigorous frame is emphatically wealth. Every day, during which their capacity to labor is impaired by sickness or accident, is so much deducted from the fund upon which they and their families can alone depend for support; and yet, from a thousand circumstances intimately connected with their several professions, the health and vigor of their systems is liable, not merely to temporary impairment, but too often, to complete destruction, whenever they place themselves in opposition to the laws of nature, or from ignorance or prejudice, overlook every precept of hygiene. One of the means best calculated, therefore, to effect that amelioration in the condition of the workingmen which they themselves, as well as their friends of every profession, so earnestly desire, is to diffuse among them a knowledge of the laws of health, and of the means of avoiding the deleterious agents to which they are exposed.'

Perhaps we cannot present a better argument in favor of the education of mechanics than is contained in the above quoted remarks. The workingman's treasure lies in his body; and ought he not to bestow at least as much pains in preserving it sound and active as the miser does upon his chests of ore? All men desire life and health; and upon all it is incumbent, as they value these blessings, to use every means of preserving them. But to the workingman, his health is his life, for on *it* depends the means of supporting his life.

But the mechanic is, from necessity—from the nature of his occupation—often placed in situations where a greater degree of care is required to preserve the health, than is necessary for other classes. A portion labor in damp, unhealthy mines, in wells and cellars; some are perpetually exposed to the fumes of melted metals, which are well known to be poisonous; others again are liable to injury from the postures in which they are obliged to work, from the want of sufficient or proper kinds of exercise, or even from the use of certain tools and instruments. Who will say that especial care is not needed, to be guarded against all the evil effects arising from these and other similar sources?

Much of this evil results from ignorance; from either not knowing the nature or degree of the danger, or the proper means of removing or avoiding it. Unnecessary exposure to poisonous vapors, working or sitting in postures injurious to health, which might be changed for better ones, using tools of an improper construction, for want of knowledge or ability to construct better ones,—such are the modes in which ignorance is the producer, directly or indirectly, of her numberless evils.

But, you ask, has science, in her boasted progress, removed any of these evils? Many, undoubtedly: and were it not that prejudice interposes a screen to her light, wherever it dawns upon the darkness of ignorance, she might have removed many more. The improvements in the system of mining, in the coal regions of England, whereby the mines are much better ventilated, and freed from noxious and stagnant vapors, than formerly, together with the safety lamp, are a few of the successful efforts of science in the cause of philanthropy. The knowledge of the disinfecting powers of chlorine and charcoal, and the property of the latter to preserve animal substances from decay, may become, if they have not already, a conservative of life and health to thousands. But while we remain, not only ignorant of the properties of these agents,

but in disbelief of them, what can be expected in the cause of humanity, from anything that science can do?

It cannot be, till the mechanic himself pays a due regard to the rules of preserving health, and learns the laws of the human system, that the greatest degree of security from the evils of which we complain can be secured. How can he be expected to insure himself from the effects of poisonous vapors, from mineral ores, &c., until he knows their nature, and the manner in which they operate upon the system. How can he know that the very precautions he is using are not the surest means of rendering himself a prey to the poison. Neither is this a mere supposition. Hundreds, if not thousands, have died from poison, taken unawares, who might have saved themselves, had they known the nature of the poison, and the proper remedy. On the contrary, has it not happened, that the supposed antidote, which they took, or it may be, one out of many antidotes which were forced into their stomachs, was the very means of hastening their death, by expediting the effects, or adding to the violence of the poison?

But you inquire, finally, whether a knowledge of the principles of science themselves are requisite for the mere laborer, while, as it appears to you, it would be amply sufficient for those who have time to pursue those inquiries more fully, to give all necessary directions and rules derived from those principles, by which the laborer should be guided; and whether they cannot find out and teach the application of scientific principles to the means of preserving health and improving the condition of the people, even better or faster than the people could in any way do it themselves. We answer, No.—In the first place, it is necessary to enlighten their minds thoroughly, with these very principles, before you can, in most instances, make them believe and act upon the rules deduced from them. No more experience is needed on this head. Again:—by knowing the principles they will know so much better how to apply them to their own cases; and only thus, can they know how to vary them so as more perfectly to be suited to peculiar circumstances, which, it can but be allowed, the proposers of the rules, however learned, may neither know of nor be capable of providing for, half so well as those who are influenced by them.

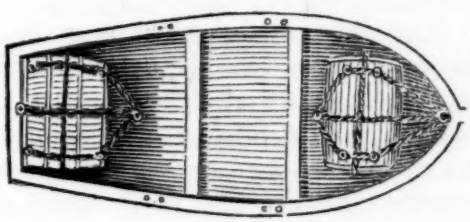
The mechanic alone may have that practical knowledge of the circumstances affecting his health, which must be necessary, in order to provide for its preservation in

other circumstances; and the merely scientific man who undertakes to dictate rules of conduct and regimen for him, may, perhaps, find himself in the condition of one who, living five hundred miles from salt water, should pretend to give directions concerning the management of naval affairs.

BRENNER'S LIFE BOAT.

[Furnished for the Mechanic.]

BY LIEUT. R. PARK.



The late melancholy shipwreck of the Lyon, attended with the loss of several lives which might probably have been saved by the means below referred to, induces us to recall to the minds of our readers an expedient which we deem highly valuable to diminish the dangers of the sea, and one which we fear is not sufficiently known among our own mariners. We allude to the means of preparing a boat so as to prevent it from sinking, even in a surf, though manned and filled with water, invented by Rev. Mr. Brenner of England, and thence termed Brenner's Life Boat. Though first proposed in 1792, before the invention of the life boat buoyed by cork, and though partially superseded by the latter, it may still be useful in many cases where the modern one is unprovided, and thus be the means of rescuing the wrecked mariner from a watery grave.

The danger in ordinary boats is, that possessing no buoyant power, they sink as soon as filled with water; to which they are liable not only from the waves breaking over them, but from their dashing against the rocks when driven on a lee-ward, surge-swept shore. It is desirable, therefore, in such emergencies, to have a boat which will still float and support its load, though filled with water. For then, though the planks may be torn asunder by its striking against obstacles,

the frame will still hold together, and the crew will still be safe from drowning; and in danger only from intemperate climates or want of sustenance.

The plan which Mr. Brenner proposed, and which has met with extensive approbation, for giving buoyancy to common boats, is shown in the engraving.

It consists in securing casks or hogsheads, or barrels of any convenient size, in the interior of the boat, by means of ropes and additional rings driven into the keel inside, assisted by the ordinary fastenings. The casks must be empty and water-tight, and as large as the boat will contain. Each cask is fitted at each end with a sling, having two eyes about six inches asunder, and so placed in the boat that the slings shall be on the upper side of the cask. Through these eyes the ropes will pass, which fasten to the rings in the keel and stem or stern. The ropes which pass over the casks athwart the boat may be fastened either by rings in the ribs, or by holes freely made in the side of the boat; as it will be in no danger of sinking by the admission of water, and would probably fill in any case. As long as the casks thus secured, and doubly protected within the boat, remain air tight, so long may the boat be depended upon to float with a suitable load. Mr. Brenner thinks that boats of from 16 to 20 feet in length, are of the most convenient size for saving the crews of ordinary merchant ships, and such they would usually possess. A boat of such dimensions may be buoyed by two hogsheads, one at each end, or by four barrels distributed at pleasure, and properly secured. As a gallon of water weighs ten pounds, two hogsheads of 63 gallons each, would, when empty and air tight, possess a buoyant power of nearly twelve hundred and sixty pounds. To prevent the boat from capsizing, it will be necessary to add about 200 lbs. of ballast, a bar of lead or pig iron for instance, which should be firmly secured to the keel on the inside. The boat thus prepared would convey a crew of six or eight men, and probably live through the heaviest surf till thrown upon shore beyond its reach. The plan has been approved by the Trinity House at London, and the Highland Society of Scotland, besides many others; and has rescued many lives from destruction on the rocky shores of Britain's fast anchored isle.

The plan may be applied to boats of any size and description, the best being those which have the strongest frame, and which are not too large to be easily handled. It is not intended to supersede the life boat buoyed by cork, and which should belong, if not to every ship, at least to every harbor; but it is

intended as a substitute in those cases where a still better life boat has been neglected. And as almost every vessel has boats, tight casks, and ropes always on board, the preparations may readily be made, in anticipation of a storm, or almost at the last crisis, it being only desirable that the boat should be previously fitted with the proper rings for fastenings.

INFORMATION RELATING TO INDUSTRY.

[Original.]

In introducing to the notice of our readers from the Mercantile Journal, a valuable statistical table of the manufacturing industry at Lowell, we take occasion to suggest the very great importance and utility of statistical information of all kinds, but more especially of that which relates to the employment of the labor by means of which the wants of the whole community are supplied. We may pass by the shop of a mechanic and see him busily engaged from day to day in the labors of his art, without reflecting that he is of any very great importance to the world at large, or that those of his craft in their collected force are worthy of any particular notice. The movements of some prominent politician, may appear to us of much greater importance.

But if we inquire into the yearly amount of the products of the labor of but one industrious artizan, and multiply it by the number engaged in the same occupation, we begin to correct our estimate. If we extend our inquiries to all the different classes of the community, the proceedings of those who stand foremost in the public view, will be found to derive almost all their importance from their effect on the industry of the country. Of what consequence is it who may have the control of seven millions of the public money, or of five times seven millions of money belonging to individuals, if the laborer find equal encouragement for the time, and equal certainty of its continuance? But if the measures to be determined upon and pursued by an individual may, directly or indirectly, affect the industry of the country; if they may take from the capitalist the means of giving employment to the laborer, and from the laborer the opportunity of employing his skill and strength for his own advantage—there is a fearful responsibility attending the exercise of such a power. It is a

power which should not be confided, without the strongest and most urgent necessity, to the hands of any man who may be subject to the common infirmities of human nature. Kings and kings' ministers, presidents and secretaries of departments, cannot see the one hundredth part of the consequences of measures of public policy which affect the industry of the country. None but those who have examined the various ramifications and dependencies which connect one department of industry with another, and who have taken some notice of the numbers engaged, and of the sum total of the produce of their joint labors, can judge of the importance of measures of public policy or individual enterprise.

We are not of the number of those, who believe that any great good can be effected by associations designed expressly to regulate and control the industry of the country. We believe the mistakes of ignorance and bias of self-interest, would often do incalculably more injury than all the good that might in any case be expected from them would be worth. But we should most heartily rejoice to hear of the formation of an association designed expressly to procure and disseminate, in a digested and convenient form, the immense mass of statistical information which the activity and enterprise of the American people would afford. We would especially recommend, whenever the formation of such an association shall be announced, that every man who proposes to live by his industry, should take an interest in it, and favor its objects as far as it may be in his power, without prejudice to his business. That the community would be extensively benefited by a more general dissemination of such information, there can be no question. The facts that might be collected, would serve to modify the opinions of reflecting men on many questions of the utmost importance to the prosperity and happiness of the people. The impolicy of war under almost any circumstances, in which it might be possible to avoid it, would be most clearly demonstrated. The causes of pauperism, and the means of preventing it, (a question of momentous consequence,) the effects of slavery in places where it is established, and many other subjects, would be elucidated by an accumulation of facts which individual self-interest could not gainsay nor resist.

The following is the Table above referred to, containing a statement of the amount and kind of labor employed in Manufactures in the town of Lowell:

STATISTICAL TABLE OF THE MANUFACTORIES AT LOWELL;

PREPARED FOR JAN. 1, 1835, BY WILLIAM AUSTIN, AGENT OF THE LAWRENCE CORPORATION.

CORPORATIONS, .	*Locks & C'ls.*	*Merrimack.*	*Hamilton.*	*Appleton.*	*Lowell.*	*Suffolk.*	*Tremont.*	*Lawrence.*	*Middlesex.*	*Total.*
Capital Stock, . .	600,000	1,500,000	900,000	500,000	500,000	450,000	500,000	1,200,000	500,000	6,650,000
Number of Mills, .	1	Print Works and 5.	Print W'ks and 3.	2	Cotton & Carpet Mill in 1 build'g.	2	2	4, another and Bleachery preparing.	2	22 Mills, beside Print Works, &c.
Spindles, ...		34,432	18,944	10,240	4,500 Cotton besides Woolen.	10,240	11,136	24,192	3,120	116,804
Looms, ...		1,253	560	350	140 Cotton, 68 Carpet	350	404	710	98	3,933
Females employed, .		1,321	780	475	325	460	450	1,000	240	5,051
Males employed, .	200	437	200	70	150	70	80	160	145	1,512
Yards made per week,		172,000	78,000	80,000	43,270	90,000	120,000	164,000	6,000	753,270
Bales Cotton used,		110	70	86	76	86	86	156	None.	670
Pounds Cotton wrought		40,000	25,000	30,000	25,600	30,000	30,000	54,000	470,000 wool pr an. & 1,500-000 teas'ls.	235,700 Cotton.
Y'ds dyed and printed,		150,000	70,000	None.	None.	None.	None.	None.	6,000	226,000
Kinds of Goods made,	Machinery Cars & Eng's for R. Roads.	Prints and Sheet'gs No. 22 to 40.	Prints and Drillings No. 14 to 40	Sheet'gs & Shirtings No. 14	Carpet, Rugs & negro Cloth.	Drillings, No. 14	Sheetings & Shirt'gs, No. 14.	Sh't'gs & Shirt. No. 14 to 30, 37 to 41 in. wide.	Broadcloths and Cassimeres.	
Tons Anthracite Coal expended per ann.,		4,696	2,000	300	180	294	329	500	240	11,239
Cords of wood per ann.,		1,400	1,500	100	500	70	60	120	1,000	4,750
Gallons of Oil, . .		6,800	6000	3,500	Olive 3000 Sperm 4500	3,840	3,692	6,217	Olive 10,500 Sperm 2,500	50,549
Diam. of Water W'ls.,		30	13	13	13	13	13	17		
Length of do. for each Mill,		24	42	42	60	42	42	60		
Incorporated, . . .		1822	1825	1828	1828	1830	1830	1830	1830	
Com. Operations., .		1823	1825	1828	1828	1832	1832	1833-4	1833	
How warmed, . .		Hot air fur.	Hot air fur.	Hot air fur.	Hot air fur.	H't a. fur.	Hot air fur.	Steam.	Fur. & Steam.	

MISCELLANEOUS REMARKS.

Yards of cloth made per annum, 39,170,040; pounds of cotton consumed, 12,256,400 assuming half to be upland, and half New Orleans and Alabama, the consumption in bales is 34,800; a pound of cotton averaging 3 2-10th yards; 100 lbs. cotton will produce 89 lbs. cloth.

As regards the health of persons employed, great numbers have been interrogated, and the result shows, that six of the females out of ten, enjoy better health than before being employed in the mills,—of males, one half derive the same advantage. As regards their moral condition and character, they are not inferior to any portion of the community.

Average wages of females, clear of board, $1,90 per week; do. do. of males, clear of board, 80 cts. per day; medium produce of a loom on No. 14 yarn, 38 to 49 yards per day; do. do. No. 30, 25 to 30 yards; average per spindle 1 1-10th yard per day. Persons employed by the Companies are paid at the close of each month. The average amount of wages paid per month, $89,000. A very considerable portion of the wages is deposited in the Savings Bank. Consumption of starch per annum, 310,900 lbs.; do. of flour for do. in Mills, Print Works and Bleachery, per annum, 3,800 bbls.; do. of char. coal, per annum, 500,000 bushels.

To the above named principal establishments, may be added, the extensive Powder Mills, of O. M. Whipple, Esq.; the Lowell Bleachery; Flannel Mills; Card and Whip Factory; Planing Machine; Reed Machine; Grist and Saw Mills, together employing about three hundred hands, and a capital of $300,000. Also, in the immediate vicinity, Glass Works, and a Furnace, supplying every description of castings.

On the 1st of June next, the Middlesex Company will manufacture 500 yards of Sattinet per day, in addition to the above, and the consumption of wool will then be 2000 lbs. per day in their establishment. The Locks and Canals Machine Shop, included among the twenty-two Mills, can furnish machinery complete for a Mill of 5000 Spindles in four months, and lumber and materials are always at command, with which to build or rebuild a Mill in that time, if required.

Some practical remarks on the above table and statements we are obliged to defer to the next number. In the mean time, we call our readers, and all who are interested in the object which it is our especial endeavor to promote, to the consideration of this fact:—That before the state of the operative classes can be improved, their present situation must be thoroughly investigated. We must find out where they are, and what they are doing; and then only can we know what are the means most proper for improving their condition, or rather what are the motives which will most effectually operate to induce them to improve it themselves.—[Eds. Mechanic.]

EAST INDIAN SAW.

[Original.]

In so simple an instrument as this, one would have wondered if we had not already arrived at the desideratum of useful perfection. In India, it seems, the saw is made so as to cut while drawn towards the operator, instead of when pushed from him. This construction will have two advantages over our method.

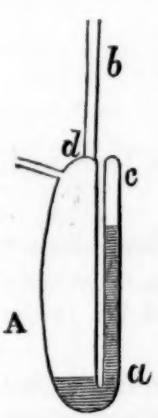
1. It can be used with more efficient force; for, it is well known, that the strength of a man in pulling towards him, is much superior to that which he can exert in pushing.

2. It can be used with greater velocity, without bending, which will not arise from pulling, but which will happen in pushing it, where the greatest force is required in that part of the operation. So much for theory; and we do not believe the theory incorrect. At least we recommend the trial; and if mechanics have not faith enough to warrant the construction of new saws on this principle, why they can at least fix the handles of their old saws on the other end, and so use them for experiment's sake.

It will be seen that this saw is more particularly applicable in sawing where the work is on a level with or above the arms of the operator; for in this case the pull is most effective, and the thrust, on the contrary, weakest.

THERMOMETER PENDULUM.

VARIOUS methods have been devised for counteracting the expansibility of the material of which the pendulum is constructed, and thereby preventing the irregularity of movement occasioned by change of temperature. The gridiron pendulum is well known. The following contrivance, described in an English Scientific Journal, we think rather a novel one.



IN this engraving, *b* is the rod of a pendulum, A the bulb, formed of glass, having a continuation or tube *ac*, and a small capillary tube *d*. If heat be applied to A, a part of the enclosed air will, in consequence, be expelled, and by dipping the end of *d* below the surface of a quantity of mercury, and allowing the enclosed air to cool, part will enter, and when sufficient has been thus obtained to fill the tube *ac*, it may be withdrawn. By inverting the bulb, the mercury may be made to occupy *ac*, and, by applying the flame of a spirit lamp, when thus inverted, the mercury may be boiled so as to expel every particle of air from *ac*. The bulb may then be placed in its natural position, as in the figure, and the mercury will be retained in the tube *ac*, which ought to be quite full by the pressure of the atmosphere. Now let *d* be connected with a

good air-pump, and as perfect a vacuum as possible be effected; the mercury in *ac* will then descend, and its surfaces in A and *ac* will be on the same level. Air, dried by standing over the surface of sulphuric acid, or by other means, should then be very gradually admitted into the receiver of the air-pump, whence it will soon find its way into A, where, producing pressure on the surface of the mercury, it will cause it to rise in *ac*. When, by the gradual admission of the air, it has risen to the required height, which must be determined by experiment, the tube *d* is to be hermetically sealed. The mercury will then appear, as it is marked (black) in the figure. As the part at *c* will be a perfect void or vacuum, any expansion or contraction of the air in A, caused by the variation of the temperature of the atmosphere, will cause the mercury to rise and fall in *ac*. When an increase of the temperature of the air shall cause the rod attached to the bulb to become a little longer, and which, by lowering the centre of oscillation, would cause the clock to go slower, it will at the same time expand the air in A, and cause an increase of pressure on the mercury, which will therefore rise in the tube *ac;* and thus, by raising the centre of oscillation as much as the lengthening of the rod had depressed it, the vibrations will be perfectly isochronous. When a decrease of temperature shall cause the rod of the pendulum to contract and raise the centre of oscillation, the air in A will also contract, and the mercury, falling in *ac*, will lower the centre of oscillation.

AMERICAN PATENTS.

[Abridged from the Journal of the Franklin Institute.]

PATENT *for Machinery for tarring Rope Yarns;* Daniel Treadwell, Boston, Massachusetts, August 18.

The patentee states that his improvement consists in three distinct parts:—1st. In the method of heating the tar; 2. In rubbing, or untwisting the yarn, for the purpose of saturating it with tar; and 3d, In the nippers, for pressing out the superabundant tar.

The yarns to be tarred are wound upon bobbins, placed in a frame; and the kettle in which the tarring is effected is a long trough, above which there are sliding bars, having perforated metallic plates at their lower ends. Through these the yarns are passed, and by means of which they are lowered into and raised out of the kettle. The untwisting of the

yarn is effected by passing them through other metallic plates, which, by a motion communicated to them by means of cranks, so untwist the yarn that it passes through the first mentioned plate in such a condition that the tar penetrates easily throughout its fibres.

The claim is made for the method of heating the tar by steam, the rubbing and untwisting of the yarns, and the roller-nippers, by which the superabundant tar is forced out of the yarns.

PATENT *for an improvement in the Construction of the Saw Mill;* Thomas Blanchard, New York city, August 8.

A circular saw is to be used, and the timber to be fixed upon a carriage, moving in the manner of the common saw mill carriage. The shaft of the saw runs in gudgeons upon a sliding frame, which is so constructed as to allow of its being shifted transversely to the carriage, in order to obviate the necessity which exists in common mills, of moving the log laterally, after a cut has been made.

PATENT *for a Composition of Matter, applicable to the Construction of Roads, Streets, &c;* John Martineau, Eldridge, Onondaga County, New York, August 11.

The patentee claims as his invention, the application of tar, turpentine, or any other of that class of cohesive substances, reduced before use to a fluid state, and thus used as a cement to apply to, and combine with sand, gravel, pebbles, pulverized stone, (such as is used for a M'cAdamized road,) or cobble stone, the interstices of coarse materials being in all cases filled, as well as may be with sand or gravel, and cemented with tar or turpentine. He also claims the application of this composition to the lining of canals, flooms, reservoirs, cisterns, &c.

On this Dr. Jones remarks—'We have, for many years been in the habit of speaking of tar as one of the best articles which could be employed upon roads. Those who have noticed the wharves and other places where tar has been spilt on dusty roads, must have observed that it serves to cement the material so firmly, that after its incorporation with the dust or sand is completed, the heaviest loads actually make no impression upon it.'

PATENT *for improvements in the Power Printing Press;* Otis Tufts, Boston, Massachusetts, August 22.

We are informed in this specification, that 'the principal difference between this power press and others now in use, consists in supplying it with paper to be printed from one side of the frame, by using two friskets, one of which is under the operation of an impression from the platten,

while the sheet of paper last printed is being removed from the second frisket, and another sheet is applied. As soon as the frisket first mentioned has received an imprint from the types, it is withdrawn by the operation of the machinery from between the platten and form, and the second frisket caused to pass in between the platten and frame, there to be acted on in its turn. So in succession each passes out from between the platten and frame with its printed sheet, while the other with the sheet to be printed, is made to pass in between the platten and frame.'

MECHANIC CORRESPONDENCE.

PRACTICAL QUESTIONS AND PRACTICAL ERRORS.—We wish our contributors of questions and queries would make particular reference to practical matters of inquiry, instead of giving mere abstract problems whose application many are not able to understand. There are many important questions in calculations which it would be profitable to discuss; questions which occur in the every-day business of mechanics, and in which even serious errors are made, from not understanding the principles of the question. We have heard an anecdote, (which is probably true,) of a man who purchased of the owner of a water privilege the right of using the water which should flow through a certain pipe; afterwards, wanting more water, the owner agreed to let him have, for double the money, the water which should flow through a pipe of twice the diameter. QUERY.—Did either party lose, in this bargain? and if so, who? and how much?

SOLUTION of the Question in our last number.—Supposing the *line* drawn from the right angle to the hypothenuse to be a *perpendicular*, the question may be resolved as follows:—Assume m and n, for the two sides adjacent the right angle; and h for the hypothenuse. By the terms of the question, the sum of these, $m + n + h = a$, the perimeter. Then since the triangle is right angled, we have the equations $m^2 + n^2 = h^2$, and $mn = dh$; d being the perpendicular.

Adding to the second equation,	$m^2 + n^2 = h^2$
twice the third equation,	$2mn = 2dh$
the sum is	$m^2 + 2mn + n^2 = h^2 + 2dh.$

Transposing the first equation, it gives $m + n = a - h$. Squaring both

sides of this, it gives $m^2 + 2mn + n^2 = a^2 - 2ah + h^2$;

or, $h^2 + 2dh = a^2 - 2ah + h^2$.

Cancelling h^2, this gives $2dh = a^2 - 2ah$,

which reduced, gives $h = \frac{a^2}{2a + 2d}$. This is the value of the hypothenuse. The expressions for the values of m and n are complicated, but they may be found by substituting for h its value, as above found, in the equations $mn = dh$ and, $m + n = a - h$.

CORRECTION.—The author of the solution referred to in the October Mechanic, acknowledges his error. After the observer has calculated *ae* and *ce*, which it will be necessary to do, in the first place, there will be no difficulty in calculating from these the line *ac*, by trigonometry.

NOTES FOR APRIL.

SILK MACHINERY.—An enterprizing citizen of Northampton, we understand, has invented a machine for reeling silk, which it delivers, from the cocoon, ready made into thread or twist. The whole length of the machine is only five feet. Strong assurances of its success are entertained, by those who have examined it.

HINGE MANUFACTORY.—At Needham, (in this state,) is a great hinge manufactory, owned by Messrs. M'Intosh and Fisher. Twelve hands, aided by machinery, manufacture yearly forty tons of iron into hinges. The average number of hinges finished per day is about 400 sets. The hinges are cut into the proper shape, the holes punched, tools ground, and the bellows of the forges blown, by machinery.

ANECDOTE.—When Mr. Bolton, the partner of the celebrated James Watt, waited upon George III, to explain one of the great improvements in the steam-engine, which they had effected, he said to the king—'I have come, sire, to show you something which monarchs always patronize—*power*.'

CAMPHOR.—In the bazars of the East Indies, camphor is always exposed for sale in the open air, surrounded by a few pepper-corns, which prevent the evaporation of the camphor. This is a singular, and to us unaccountable instance of chemical agency.

Antidote to Arsenic Discovered.—A surgeon of Gottingen has discovered a complete antidote to arsenic. It is peroxyd (or the red oxyd) of iron, twelve parts of which neutralize one of oxyd of arsenic. It is prepared by pouring nitric acid into a very pure solution of the sulphate of iron, precipitated by ammonia, and well washed. Experiments with this antidote have been tried upon rabbits and other animals with complete success. One advantage of it is, that no injury can be done by too large a dose. In cases where large quantities of arsenic have been taken, it has been found useful first to encourage vomiting.

Hydrographic Paper.—The Advocate of Science gives an account of a newly invented paper, on which the writing is to be made with pure water. The paper is to be saturated with a solution of sulphate of iron, and covered with finely powdered galls. These are the materials of which black ink is actually made, so that the invention consists merely of allowing the pen to make the ink as it goes along on the paper, finding the material ready prepared.

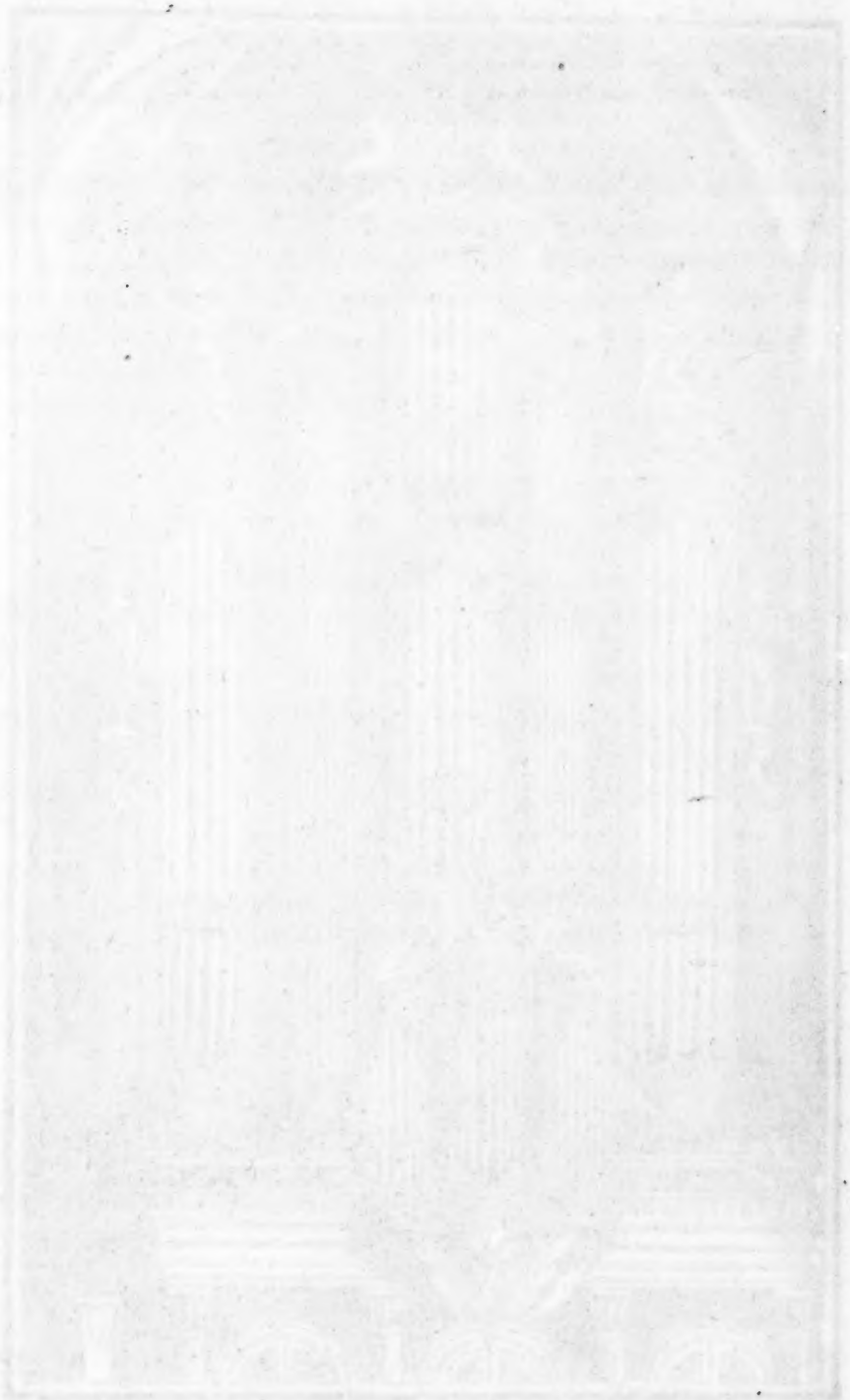
We doubt some whether it will be generally preferable, though the paper might be useful for travellers to carry to write where ink could not be procured.

Horse Shoe Machine.—Mr. Burden, the inventor of the double steam boat, has contrived a machine for making horse shoes, which throws off thirty perfect ones in a minute. What will the blacksmiths think of this?

Suspension Bridge.—A bridge of this kind is now building, over the river Sauen, near Fribourg, in Switzerland. It is 903 feet long, 22 feet wide, and 163 feet above the bed of the river. At a distance, it resembles a large cord intended for gymnastic exercises.

Black Lead for Cleaning Stoves.—Mix powdered black lead with a little gin, or the dregs of port wine, and lay it on the stone with a piece of linen rag. Then rub it bright with a dry and close but not hard brush, dipped in dry black lead powder. This will be found far preferable to boiling the black lead with small beer and soap, or mixing it with the white of eggs, as is sometimes done.

To Stain Wood Green.—Dissolve verdigris in vinegar, and with it brush over the wood.



THE GREAT ORGAN AT HAARLEM.